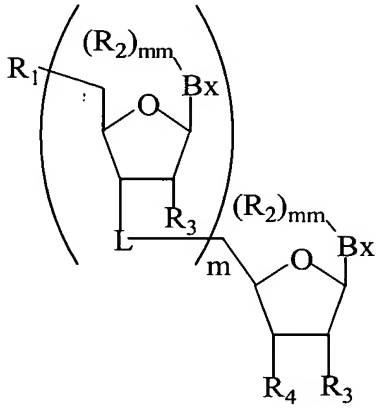
This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1 - 32. (Withdrawn).

33. (Currently amended) A compound of formula II:



(II)

wherein:

each Bx is an optionally protected heterocyclic base moiety;

R_1 is hydrogen, hydroxyl, a protected hydroxyl, a nucleoside, a nucleotide, an oligonucleoside, an oligonucleotide or a group of formula I;

R_4 is hydrogen, hydroxyl, a protected hydroxyl, a nucleoside, a nucleotide, an oligonucleoside, an oligonucleotide or a group of formula I;

each R_2 is a group of formula I:

$$—O—(CH_2)_n—J$$

(I)

wherein:

each n is, independently, from 1 to about 10;

each J is, independently, a sulfonic acid ($-S(=O)_2OH$), a sulfonate salt ($-S(=O)_2O^-X^+$), a sulfoxide ($-S(=O)-Z$), a sulfone ($-S(=O)_2-Z$), -SH, -S-S-Z, or a thiol (-S-Z);

each X^+ is a metal cation;

each Z is, independently, selected from the group consisting of C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_5-C_{20} aryl and C_5-C_{20} aryl substituted C_1-C_{20} alkyl;
each R_3 is, independently, hydrogen, hydroxyl, a protected hydroxyl, an optionally protected sugar substituent group or a group of formula I;
L is an internucleoside linking group;
m is from 3 to about 50; and
each mm is, independently, 0 or 1;
wherein at least one of said L is other than a phosphodiester internucleoside linkage and at least one of said R_1, R_2**[[**, R_3**]]** and R_4 is a group of formula I.

34. (Original) The compound of claim 33 wherein at least one R_3 is an optionally protected sugar substituent group.

35. (Original) The compound of claim 33 wherein at least two of said R_1, R_2, R_3, and R_4 are groups of formula I.

36. (Original) The compound of claim 35 wherein at least two of said R_3 are, independently, groups of formula I.

37. (Original) The compound of claim 33 wherein substantially all R_3 are groups of formula I.

38. (Original) The compound of claim 33 wherein R_1 is a group of formula I.

39. (Original) The compound of claim 33 wherein R_4 is a group of formula I.

40. (Original) The compound of claim 33 wherein J is -S-Z and Z is a straight or branched C_1 to C_{20} alkyl group.

41. (Original) The compound of claim 40 wherein said alkyl group is methyl, ethyl or propyl.

42. (Original) The compound of claim 41 wherein said alkyl group is methyl.

43. (Original) The compound of claim 33 wherein J is -S-Z and Z is aryl having from 5 to about 14 carbon atoms.

44. (Original) The compound of claim 33 wherein Z is phenyl.

45. (Original) The compound of claim 33 wherein at least one J is a sulfonic acid.

46. (Original) The compound of claim 33 wherein at least one J is a sulfonate salt.

47. (Original) The compound of claim 46 wherein X^+ is Na^+.

48. (Original) The compound of claim 33 wherein at least one J is a sulfoxide.

49. (Original) The compound of claim 48 wherein Z is substituted or unsubstituted C_1-C_{20} alkyl or substituted or unsubstituted C_5-C_{20} aryl.

50. (Original) The compound of claim 33 wherein at least one J is a sulfone.

51. (Original) The compound of claim 50 wherein Z is substituted or unsubstituted C_1-C_{20} alkyl or substituted or unsubstituted C_5-C_{20} aryl.

52. (Original) The compound of claim 33 wherein said internucleoside linking group is a phosphorus-containing internucleoside linking group.

53. (Original) The compound of claim 52 wherein said internucleoside linking group is a phosphodiester, a phosphorothioate or a phosphorodithioate.

54. (Original) The compound of claim 33 wherein m is from about 8 to about 30.

55. (Original) The compound of claim 33 wherein m is from about 15 to about 25.

56. (Original) The compound of claim 33 wherein each mm is 0.

57. (Original) The compound of claim 33 wherein n is 2.

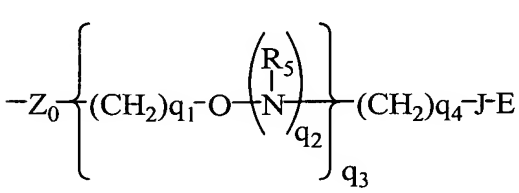
58. (Original) The compound of claim 33 wherein each of said Bx is independently selected from the group consisting of adenine, guanine, thymine, cytosine, uracil, 5-methylcytosine (5-me-C), 5-hydroxymethyl cytosine, xanthine, hypoxanthine, 2-aminoadenine, alkyl derivatives of adenine and guanine, 2-thiouracil, 2-thiothymine, 2-thiocytosine, 5-halouracil, 5-halocytosine, 5-propynyl uracil, 5-propynyl cytosine, 6-azo uracil, 6-azo cytosine, 6-azo thymine, 5-uracil (pseudouracil), 4-thiouracil, 8-substituted adenines and guanines, 5-substituted uracils and cytosines, 7-methylguanine, 7-methyladenine, 8-azaguanine, 8-azaadenine, 7-deazaguanine, 7-deazaadenine, 3-deazaguanine and 3-deazaadenine.

59. (Original) The compound of claim 33 wherein each optionally protected sugar substituent groups is, independently, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_5-C_{20} aryl, -*O*-alkyl, -*O*-alkenyl, -*O*-alkynyl, -*O*-alkylamino, -*O*-alkylalkoxy, -*O*-alkylaminoalkyl, -*O*-alkyl imidazole, -OH, -SH, -S-alkyl, -S-alkenyl, -S-alkynyl, -N(H)-alkyl, -N(H)-alkenyl, -N(H)-alkynyl, -N(alkyl)$_2$, -*O*-aryl, -S-aryl, -NH-aryl, -*O*-aralkyl, -S-aralkyl, -N(H)-aralkyl, phthalimido (attached at N), halogen, amino, keto (-C(=O)-R), carboxyl (-C(=O)OH), nitro (-NO_2), nitroso (-N=O), cyano (-CN), trifluoromethyl (-CF_3), trifluoromethoxy (-*O*-CF_3), imidazole, azido (-N_3), hydrazino (-N(H)-NH_2), aminooxy (-*O*-NH_2), isocyanato (-N=C=O), sulfoxide (-S(=O)-R), sulfone (-S(=O)$_2$-R), disulfide (-S-S-R), silyl, heterocycle, carbocycle, intercalator, reporter group, conjugate, polyamine, polyamide, polyalkylene glycol, and polyethers of the formula (-*O*-alkyl)$_m$, where m is 1 to about 10;
wherein each R is, independently, hydrogen, a protecting group or substituted or unsubstituted alkyl, alkenyl, or alkynyl wherein said substituted alkyl, alkenyl, or alkynyl are substituted with haloalkyl, alkenyl, alkoxy, thioalkoxy, haloalkoxy, aryl groups as well as

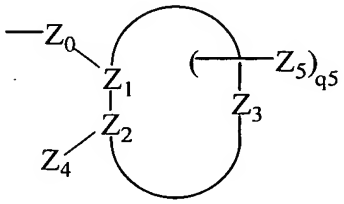
halogen, hydroxyl, amino, azido, carboxy, cyano, nitro, mercapto, sulfides, sulfones, and sulfoxides;

or each sugar substituent group has one of formula VI or VII:

wherein:



VI

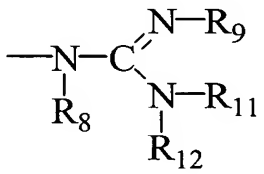


VII

Z_0 is O, S or NH;

J is a single bond, O or C(=O);

E is C_1-C_{10} alkyl, $N(R_5)(R_6)$, $N(R_5)(R_7)$, $N{=}C(R_{5a})(R_{6a})$, $N{=}C(R_{5a})(R_{7a})$ or has formula IX;



IX

each R_8, R_9, R_{11} and R_{12} is, independently, hydrogen, $C(O)R_{13}$, substituted or unsubstituted C_1-C_{10} alkyl, substituted or unsubstituted C_2-C_{10} alkenyl, substituted or unsubstituted C_2-C_{10} alkynyl, alkylsulfonyl, arylsulfonyl, a chemical functional group or a conjugate group, wherein the substituent groups are selected from hydroxyl, amino, alkoxy, carboxy, benzyl, phenyl, nitro, thiol, thioalkoxy, halogen, alkyl, aryl, alkenyl and alkynyl;

or optionally, R_{11} and R_{12}, together form a phthalimido moiety with the nitrogen atom to which they are attached;

each R_{13} is, independently, substituted or unsubstituted C_1-C_{10} alkyl, trifluoromethyl, cyanoethyloxy, methoxy, ethoxy, t-butoxy, allyloxy, 9-fluorenylmethoxy, 2-(trimethylsilyl)-ethoxy, 2,2,2-trichloroethoxy, benzyloxy, butyryl, iso-butyryl, phenyl or aryl;

R_5 is hydrogen, a nitrogen protecting group or -T-L,

R_{5a} is hydrogen, a nitrogen protecting group or -T-L,

T is a bond or a linking moiety;

L is a chemical functional group, a conjugate group or a solid support material;

each R_6 and R_7 is, independently, H, a nitrogen protecting group, substituted or unsubstituted C_1-C_{10} alkyl, substituted or unsubstituted C_2-C_{10} alkenyl, substituted or unsubstituted C_2-C_{10} alkynyl, wherein said substitution is hydroxyl, amino, alkoxy, carboxy, benzyl, phenyl, nitro, thiol, thioalkoxy, halogen, alkyl, aryl, alkenyl, alkynyl; NH_3^+, $N(R_{14})(R_{15})$, guanidino or acyl where said acyl is an acid amide or an ester;

or R_6 and R_7, together, are a nitrogen protecting group, are joined in a ring structure that optionally includes an additional heteroatom selected from N and O or are a chemical functional group;

each R_{14} and R_{15} is, independently, H, C_1-C_{10} alkyl, a nitrogen protecting group, or R_{14} and R_{15}, together, are a nitrogen protecting group;

or R_{14} and R_{15} are joined in a ring structure that optionally includes an additional heteroatom selected from N and O;

Z_4 is OX, SX or $N(X)_2$;

each X is, independently, H, C_1-C_8 alkyl, C_1-C_8 haloalkyl, $C(=NH)N(H)R_{16}$, $C(=O)N(H)R_{16}$ or $OC(=O)N(H)R_{16}$;

R_{16} is H or C_1-C_8 alkyl;

Z_1, Z_2 and Z_3 comprise a ring system having from about 4 to about 7 carbon atoms or having from about 3 to about 6 carbon atoms and 1 or 2 heteroatoms wherein said heteroatoms are selected from oxygen, nitrogen and sulfur and wherein said ring system is aliphatic, unsaturated aliphatic, aromatic, or saturated or unsaturated heterocyclic;

Z_5 is alkyl or haloalkyl having 1 to about 10 carbon atoms, alkenyl having 2 to about 10 carbon atoms, alkynyl having 2 to about 10 carbon atoms, aryl having 6 to about 14 carbon atoms, $N(R_5)(R_6)$ OR_5, halo, SR_5 or CN;

each q_1 is, independently, an integer from 1 to 10;

each q_2 is, independently, 0 or 1;

q_3 is 0 or an integer from 1 to 10;

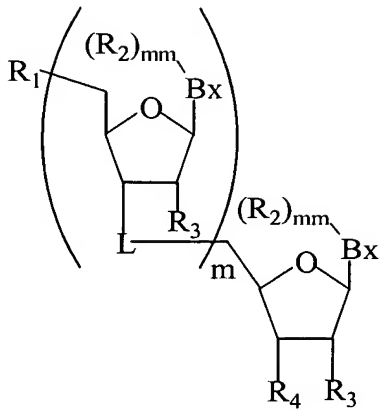
q_4 is an integer from 1 to 10;

q_5 is from 0, 1 or 2; and

provided that when q_3 is 0, q_4 is greater than 1.

60 - 99. (Withdrawn).

100. (New) A compound of formula II:



(II)

wherein:

each Bx is an optionally protected heterocyclic base moiety;

R_1 is hydrogen, hydroxyl, a protected hydroxyl, a nucleoside, a nucleotide, an oligonucleoside, an oligonucleotide or a group of formula I;

R_4 is hydrogen, hydroxyl, a protected hydroxyl, a nucleoside, a nucleotide, an oligonucleoside, an oligonucleotide or a group of formula I;

each R_2 is a group of formula I:

$$—O—(CH_2)_n—J$$

(I)

wherein:

each n is, independently, from 1 to about 10;

each J is, independently, a sulfonic acid ($-S(=O)_2OH$), a sulfonate salt ($-S(=O)_2O^-X^+$), a sulfoxide (-S(=O)-Z), a sulfone ($-S(=O)_2-Z$), -SH, -S-S-Z, or a thiol (-S-Z);

each X^+ is a metal cation;

each Z is, independently, selected from the group consisting of C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_5-C_{20} aryl and C_5-C_{20} aryl substituted C_1-C_{20} alkyl;

each R_3 is, independently, hydrogen, hydroxyl, a protected hydroxyl, an optionally protected sugar substituent group or a group of formula I;

L is an internucleoside linking group;

m is from 3 to about 50; and

each mm is, independently, 0 or 1;

wherein at least one of said L is other than a phosphodiester internucleoside linkage and at least two of said R_1, R_2, R_3 and R_4 are groups of formula I.